

REMARKS:

Claims 1-12, 14-25 and 27-30 are pending in the present Application. In the Advisory Action dated January 16, 2004, the Examiner maintained the rejection of Claims 1-12, 14-25 and 27-30 from the Office Action dated November 4, 2003, claims 13 and 26 having been withdrawn from consideration as having been drawn to a non-elected invention.

Applicant herein submits a Request for Continued Examination. Applicant request consideration of this Amendment and Response, entry of the Amendments contained herein, favorable reconsideration of the above-captioned application, withdrawal of the rejections of the remaining pending claims, and passage of the case to issue in view of the amendments, law and remarks set forth below.

Amendments to the ClaimsClaims 1-16, 18-21

In the Office Action dated December 18, 2003, the Examiner rejected claims 1-16 and 18-21 under 35 USC 102(e) as being anticipated by Mao et al. (6,490,140, hereinafter "Mao"). The rejections are deemed overcome by the amendments made hereinabove for the reasons set forth below.

Claim 1 has been amended to include the limitation that the sensor provides an increase of $\Delta R/R$ of at least 7% when compared to an otherwise identical sensor not having the upper layer, as described in the present application at p. 5, line 23 to p. 6, line 7. This degree of improvement in $\Delta R/R$ is not found in the prior art. As known to those of skill in the art, a high GMR ratio is essential to improving the performance of spin valve sensors. Allowance of claim 1 and all claims depending therefrom (claims 2-11) is respectfully requested.

Claim 3 has been amended to require that the upper layer have a thickness of less than 5 Å. The Examiner has indicated in the Office Action in the Response to Amendment section that Mao's upper seed layer defines a lower thickness limit of 5 Å.

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Applicant avoids Mao's range by claiming an upper layer having a thickness of less than 5 Å, a feature found nowhere in the prior art in the context of the remaining claimed details. As described in the application, a desirable increase in GMR ratio can be achieved by inclusion of a very thin upper layer. Use of a very thin upper layer provides the advantage of minimizing the overall sensor thickness. Note FIG. 6 of the present application.

Claim 4 has been amended to require that the upper layer be doped with a material other than NiFe or CoFe for decreasing an electrical conductivity of the upper layer, as described in the present application at p. 13, line 8 and p. 15, lines 14-20. Though the Examiner indicates in the Office Action that Mao discloses a doped upper layer, nowhere does Mao indicate that Mao's upper seed layer includes a secondary material for reducing its electrical conductivity. The benefit provided by Applicants' claimed limitation is that current shunting is reduced, thereby providing a stronger signal.

Claim 9 has been amended to require that the upper layer include both NiFe and CoFe, as described in the present application at p. 12, lines 3-4. Mao's upper layer only includes NiFe and nowhere does Mao teach or suggest use of a combination of NiFe and CoFe in an upper layer.

Claim 10 has been amended to require that the underlayer comprise NiFeX where X is not Cr as supported in the present application at p. 13, lines 1-2. Not only does Mao fail to disclose any underlayer material other than NiFeCr, Mao indicates that a layer of NiFeCr is critical to the functionality of Mao's structure. The Examiner is directed to col. 3, lines 40-46 of Mao, where Mao states that his invention is a combination of a NiFeCr seed layer and a PtMnX pinning layer.

Claim 11 has been amended to require that the upper layer be nonmagnetic, as described in the present application at p. 15, lines 14-20. Nowhere does Mao indicate that Mao's upper seed layer is nonmagnetic. The benefit provided by Applicants' claimed limitation is that buildup of magnetic moment in the underlayer is avoided, thereby providing consistent results.

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Claim 12 has been amended to include limitations similar to the limitation added in claim 10, and is therefore believed to be allowable for the same reasons as claim 10. Allowance of claim 12 and all claims depending therefrom (claims 13-16) is respectfully requested.

Claim 18 has been amended to include limitations similar to the limitation added in claim 3, and is therefore believed to be allowable for the same reasons as claim 3. Allowance of claim 18 is respectfully requested.

Claim 19 has been amended to include limitations similar to the limitations added in claims 4 and 11, and is therefore believed to be allowable for the same reasons as claims 4 and 11. Allowance of claim 19 is respectfully requested.

Claim 20 has been amended to include limitations similar to the limitations added in claims 1, 4 and 11, and is therefore believed to be allowable for the same reasons as claims 1, 4 and 11. Allowance of claim 20 is respectfully requested.

Claim 21 has been amended to include limitations similar to the limitation added in claim 1, and is therefore believed to be allowable for the same reasons as claim 1. Allowance of claim 21 is respectfully requested.

Claim 17

In the Office Action dated December 18, 2003, claim 17 was rejected under 35 USC 103(a) as being unpatentable over Mao. Claim 17 has been amended to include limitations similar to the limitation added in claim 3, and is therefore believed to be allowable for the same reasons as claim 3. Allowance of claim 17 is respectfully requested.

In the event a telephone conversation would expedite the prosecution of this application, the Examiner may reach the undersigned at (408) 971-2573. For payment of any additional fees due in connection with the filing of this paper, the Commissioner is authorized to charge such fees to Deposit Account No. 50-2587 (Order No. SJO920000121US1).

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Respectfully submitted,

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